DECISION DOCUMENT

Upgrade Standard Specification of Construction Area Signs (Section12-3.06) to "Permanent" Roadside Signs Standards (Section 56-2)

Problem Statement: For the October 5, 2010 Cal ATSSA Liaison Committee meeting, Cal ATSSA suggested that: "A mounted traffic / highway sign in a workzone (Construction Area Signs) must conform in all aspects with Caltrans sign design / material / back framing / manufacturing specifications."

Should a construction area sign held to the same standards as a "permanently installed" roadside sign?

Recommendation: Review current standards on Construction Area Signs and update them as needed.

Fiscal Impact: When Standard Specifications (Std. Spec.) or Standard Special Provisions (SSP) are updated to a more costly standard it will raise contract bid price result in higher costs of construction contracts.

Organizational Impact: No change in business process. Caltrans will be in more cooperation and information sharing with the industry and organizations such as CalATSSA. There will be a minor increase in workload as staff will be assigned to review and revise the current standards. Other divisions of Caltrans and FHWA who are the stake holders will have to approve any policy updates.

Policy Impact: Any policy update will result in new or updated SSP. New or changes to standard plan(s) and / or the Std. Spec. may also be needed.

Risks: Contractors may not support new or updated standards that may require them to upgrade or replace their current sign inventory.

Proposed Implementation Schedule: On going. Any new or updated policy will be reviewed and approved by stake holders then send to Office Engineer for publishing.

Contact Person:

Gordon Wang
Transportation Engineer, Office of Signs and Workzones
Division of Traffic Operations
E-mail address: gordon_wang@dot.ca.gov
Phone number: (916) 653-1816

APPROVAL RECOMMENDED:

10-1-10

GORDON WANG, Date
Transportation Engineer, Office of Signs and Workzones

APPROVED BY:

10-1-10

WAYNE HENLEY Date
Chief, Office of Signs, Markings and External Support

Attachment(s)

1. Decision Document Attachment
2. Email written by Michael Moore (President, Safeway Sign Co.) forwarded by Paul Anderson (manager, CHRISP Co.)
3. Standard Specification Section 12-3.06
4. Standard Special Provision 05-000, 12-003
5. Standard Plan sheet RS1 – RS4
6. Standard Specification Section 56-2
7. Standard Special Provision 56-800

DECISION DOCUMENT ATTACHMENT

Upgrade Standard Specification of Construction Area Signs (Section12-3.06) to "Permanent" Roadside Signs Standards (Section 56-2)

1. Background:

1.1 CalATSSA issue:

On September 27, 2010, CalATSSA – Caltrans Liaison Paul Anderson sent Caltrans an Email written by CalATSSA member Michael Moore. Michael Moore stated:

We notice the breakdown with regards to Sign specs in Work Zones (WZ) **due to the word "temporary". Signs in WZ are mounted for long periods of time that we think should be considered Permanent status. There seems to be discrepancies and contradictions with the word "temporary". Temporary Signs should refer to roll-up type signs or signs placed on barricades and moved within a 12 hr period. CAN A SIGN THAT IS MOUNTED ON A WOOD POST IN A WORK ZONE, FOR OVER A MONTH TO YEARS BE CONSIDERED "TEMPORARY" and NOT FOLLOW CALTRANS SIGN MATERIAL SPECIFICATIONS ? A mounted traffic/highway sign in a WZ, MUST conform in ALL aspects with CalTrans sign design-materials-back framing manufacturing specifications.**

1.2 Current Caltrans Standards:

California Manual on Uniform Traffic Control Devices (CA MUTCD) defines temporary traffic control (TTC) zone as (Section 1A.13) "An area of a highway where road user conditions are changed because of a work zone or incident by the use of temporary traffic control devices, flaggers, uniformed law enforcement officers, or other authorized personnel." The word temporary in TTC Zone is not related to a time frame. It indicates that a sign or a traffic control device used for TTC is not a permanent roadway feature and will not stay in place when TTC is removed.

In Caltrans standards such as Standard Plans and Std. Spec., signs used in TTC zones are defined as "Construction Area Signs" not "Temporary Signs".

Currently Construction Area Signs Standard Specification (Std. Spec.) is written in Section 12-3.06 of the Std. Spec. and 05-000 & 12-003 of the Standard Special Provisions (SSP).

Roadside Signs Standards are found in Section 56-2 of the Std. Spec., Sheet RS1 to RS4 of the Standard Plans, and 56-500 to 56-880 of the SSP.

1.3 Differences in standards between "Construction Area Signs" and "Roadside Signs"

1.3.1 Sign panel material

Construction area signs: "All sign panels shall be product of commercial sign manufacture..." (Std. Spec. 12-3.06)

Roadside signs are made of aluminum, fiberglass reinforced plastic or laminated panel. The choice of material is specified by design engineer using SSP for each sign.

1.3.2 Quality Control, Visibility, legibility, color and retroreflectivity of the sign
Construction area signs can be in used condition where roadway signs have to be made of new material. At the end of construction contract construction area signs become the properties of the contractors where roadway signs are the properties of the state.

Construction area signs are "Considered satisfactory if they conform to the requirements for visibility and legibility and the colors conform to the requirements in Part 6 of the MUTCD and of the MUTCD California Supplement. A significant difference between day and nighttime retroreflective color will be ground for rejecting signs." (Std. Spec. 12-3.06)

Roadside Signs quality control standard (SSP 56-800) states: "The requirements of "Quality Control for Signs" in this section shall not apply to construction area signs."

1.3.3 Sign installation and mounting.
For Construction area signs Std. Spec (12-3.06A) states:
Stationary mounted signs shall be installed on wood posts in the same manner shown on the plans for installation of roadside signs, except as follows:

1. Back braces and blocks for sign panels will not be required.
2. The height to the bottom of the sign panel above the edge of traveled way shall be at least seven feet.
3. Construction area sign posts may be installed on above ground temporary platform sign supports as approved by the Engineer, or the signs may be installed on existing lighting standards or other supports as approved by the Engineer. When construction area signs are installed on existing lighting standards, holes shall not be made in the standards to support the sign.
4. The post embedment shall be 2.5 feet if post holes are backfilled around the posts with portland cement concrete produced from commercial quality aggregates and cement with not less than 295 pounds of cement per cubic yard.

Post size and number of posts shall be as shown on the plans, except that when stationary mounted signs are installed and the type of sign installation is not shown on the plans, post size and the number of posts will be determined by the Engineer. Posts shall be good sound wood posts, suitable for the purpose intended.
Sign panel fastening hardware shall be commercial quality.

Roadside signs are mounted on either metal or wood posts using specific hardware. The posts are made of steel or wood that meet specific specifications. The reason for such detailed specification is that Caltrans will have to maintain and repair those signs once construction has ended. All posts and hardware used have to be the interchangeable with what Caltrans has in stock.

2. Alternatives:

2.1 Alternative A ("No Action" Alternative):

All Standard Plans and Specifications should be reviewed and updated on routine basis and / or as needed. "No action" is not consistent with Caltrans policy.

2.2 Alternative B: Replace construction area sign standards with roadside sign standards.

Pro: All signs will be held to a uniform standard. No need to maintain two sets of standards.

Con: Quality control of construction area signs will be time consuming and labor intensive. Signs will not be reused from project to project so cost will go up significantly. Lesser flexibility for contractors in selecting signs that they own and use.

2.2.1 Fiscal Impact: It will raise contract bid price result in higher costs of construction contracts.

2.2.2 Organizational Impact: Small decrease in workload since only one set of standards will be maintained. There will be a significant increase in workload for construction inspection staff.

2.2.3 Policy Impact: Std. Spec. Section 12-3.06 will simply refer to Section 56 for standards.

2.2.4 Risks: Contractors will not support such standards that will require them to upgrade or replace most of their current sign inventory.

2.3 Alternative C (Recommended Alternative): Review current standards on Construction Area Signs and update them as needed.

Pro: No change in business process. Give flexibility to contractors. Standards can be revised or updated easily. No significant cost increase immediately. We will be in more cooperation and information sharing with the industry and organizations such as CalATSSA.

Con: Will have to maintain two sets of standards, one for "Construction Area Signs" and one for "Roadside Signs"

2.3.1 Fiscal Impact: When Std. Spec. or SSP is updated to a more costly standard it will raise contract bid price result in higher costs of construction contracts.

2.3.2 Organizational Impact: There will be an increase in workload as staff will be assigned to review and revise the current standards. Other divisions of Caltrans and FHWA who are the stake holders will have to approve any policy updates.

2.3.3 Policy Impact: Any policy update will result in new or updated SSP. New or changes to standard plan(s) and / or the Std. Spec. may also be needed.

2.3.4 Risks: Contractors may not support new or updated standards that may require them to upgrade or replace their current sign inventory.

3. Performance Measures:

3.1 Deliverable(s):

Revised policy. New or revised Standard Plans, Standard Specifications, and / or SSPs.

3.2 Change Measure(s):

Feedback will be obtained from Caltrans field personnel and industry associations such as Cal ATSSA on any new or updated policy. Review and revise policies will be on going and as needed.

4. Contact Person:

Gordon Wang
Transportation Engineer, Office of Signs and Workzones
Division of Traffic Operations
E-mail address: gordon_wang@dot.ca.gov
Phone number: (916) 653-1816

Paul Anderson

From: Michael Moore [mmoore@safewaysign.com]
Sent: Friday, August 27, 2010 1:06 PM
To: panderson@chrispco.com
Subject: CT Liaison form

CalATSSA LIAISON COMMITTEE
INPUT FORM

1) Describe the problem issue or idea. **We notice the breakdown with regards to Sign specs in Work Zones due to the word "temporary". Signs in WZ are mounted for long periods of time that we think should be considered Permanent status. There seems to be discrepancies and contradictions with the word "temporary". Temporary Signs should refer to roll-up type signs or signs placed on barricades and moved within a 12 hr period. CAN A SIGN THAT IS MOUNTED ON A WOOD POST IN A WORK ZONE, FOR OVER A MONTH TO YEARS BE CONSIDERED "TEMPORARY" and NOT FOLLOW CALTRANS SIGN MATERIAL SPECIFICATIONS ? A mounted traffic/highway sign in a WZ, MUST conform in ALL aspects with CalTrans sign design-materials-back framing-manufacturing specifications.**

a Is this a district issue or is it statewide? **Statewide**
b Provide CT names or contact information, if available. **Jennifer Perry, Don Howe, Gordon Wang**
c What other companies are experiencing the same problem or opportunity?
d How urgent is this problem or opportunity? **This is a Safety issue in ALL Work Zones now.**
e Are there experts that can help us with this?

2) What is your solution? **There needs to be a consistency with Signs and Products used for long periods in a Work Zone. The Solution is to stop using the term "Temporary" for products that are being used in a WZ for over a few hours or a few days. The MUTCD and CALIF-MUTCD needs to define "temporary".**

a What have you done to try and resolve this on your own? **We have met with CalTrans Headquarters. Have reviewed MUTCD and Calif-MUTCD Temp Traffic Control Manual to find "Temporary" definitions.**
b How would your solution benefit CalATSSA members? **ATSSA needs to promote Quality and Safety. When specifications and standards are not monitored, it opens chance for accidents and errors. Members benefit by making sure all vendors and suppliers are meeting specifications, while Highway Safety remains at Top levels of consistency.**

3) PLESE ATTACH ANY SUPPORTING DOCUMENTATION, DRAWINGS, AND OTHER ITEMS OF INTEREST TO SUPPORT THE PROBLEM, ISSUE OR IDEA.

4) Please provide the following information about you:

Name: Michael Moore
Company: Safeway Sign Co.
Tel #: 760.246.7070
Fax #: 760.246.5512
E-mail: mmoore@safewaysign.com

Thank you,

All;

Hello ! It's CalATSSA Liaison Committee Issue request time. Please read the attachments and participate.

Thank you for your time-

Paul

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Michael Moore
President
Safeway Sign Co.
"Signs of Life" since1948

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- The base shall be large enough to accommodate a minimum of two 12-V automotive type storage batteries, and shall be of such shape and mass that the beacon will not roll in the event it is struck by a vehicle or pushed over.
- The lamp shall be rated at 25 W for operation on 12-V battery current.
- The flashing beacon assembly shall be weatherproof and shall be capable of operating a minimum of 150 hours between battery recharging or other routine maintenance.
- The standard and base shall be finished with 2 applications of a commercial quality orange enamel similar in color to No. 12473 of Federal Standard 595B. The interior of the visor and the front face of the backplate shall be finished with 2 applications of commercial quality flat black enamel.

12-3.06 CONSTRUCTION AREA SIGNS

- The term "Construction Area Signs" shall include all temporary signs required for the direction of public traffic through or around the work during construction. Construction area signs are shown in or referred to in Part 6 of the MUTCD and of the MUTCD California Supplement.
- Construction area signs shall be installed at the locations shown on the plans as directed by the Engineer.
- Construction area signs designated as stationary mounted on the plans shall conform to the provisions in Section 12-3.06A, "Stationary Mounted Signs," and construction area signs designated as portable signs on the plans shall conform to the provisions in Section 12-3.06B, "Portable Signs." Construction area signs not designated as stationary mounted nor as portable on the plans shall be, at the Contractor's option, either stationary mounted or portable signs conforming to the provisions in Sections 12-3.06A or 12-3.06B.
- All construction area signs shall conform to the dimensions, color and legend requirements of the plans, Part 6 of the MUTCD, Part 6 of the MUTCD California Supplement, and these specifications. All sign panels shall be the product of a commercial sign manufacturer, and shall be as specified in these specifications.
- Sign panels for all construction area signs shall be visible at 500 feet and legible at 300 feet, at noon on a cloudless day and at night under illumination of legal low beam headlights, by persons with vision of or corrected to 20/20, except that the nighttime requirement shall not apply to fabric sign panels for portable signs.
- The Contractor may be required to cover certain signs during the progress of the work. Covers for construction area signs shall be of sufficient size and density to completely block out the message so that it is not visible either during the day or at night. Covers shall be fastened securely to prevent movement caused by wind action.
- The Contractor shall clean all construction area sign panels at the time of installation and as often thereafter as the Engineer determines to be necessary, but at least once every 4 months.
- Used signs with the specified sheeting material will be considered satisfactory if they conform to the requirements for visibility and legibility and the colors conform to the requirements in Part 6 of the MUTCD and of the MUTCD

California Supplement. A significant difference between day and nighttime retroreflective color will be grounds for rejecting signs.

• To properly provide for changing traffic conditions and damage caused by public traffic or otherwise, the Contractor shall be prepared to furnish on short notice additional construction area sign panels, posts and mounting hardware or portable sign mounts. The Contractor shall maintain an inventory of the commonly required items at the jobsite or shall make arrangements with a supplier who is able, on a daily basis, to furnish the items on short notice.

12-3.06A Stationary Mounted Signs

• Stationary mounted signs shall be installed on wood posts in the same manner shown on the plans for installation of roadside signs, except as follows:

1. Back braces and blocks for sign panels will not be required.
2. The height to the bottom of the sign panel above the edge of traveled way shall be at least 7 feet.
3. Construction area sign posts may be installed on above ground temporary platform sign supports as approved by the Engineer, or the signs may be installed on existing lighting standards or other supports as approved by the Engineer. When construction area signs are installed on existing lighting standards, holes shall not be made in the standards to support the sign.
4. The post embedment shall be 2.5 feet if post holes are backfilled around the posts with portland cement concrete produced from commercial quality aggregates and cement with not less than 295 pounds of cement per cubic yard.

• Post size and number of posts shall be as shown on the plans, except that when stationary mounted signs are installed and the type of sign installation is not shown on the plans, post size and the number of posts will be determined by the Engineer. Posts shall be good sound wood posts, suitable for the purpose intended.

• Sign panel fastening hardware shall be commercial quality.

12-3.06B Portable Signs

• Each portable sign shall consist of a base, standard or framework and a sign panel. The units shall be capable of being delivered to the site of use and placed in immediate operation.

• Sign panels for portable signs shall conform to the provisions for sign panels for stationary mounted signs in Section 12-3.06A, "Stationary Mounted Signs," or shall be Type VI retroreflective sheeting, or shall be cotton drill fabric, flexible industrial nylon fabric or other approved fabric. Fabric signs shall not be used during the hours of darkness. Size, color and legend requirements for portable signs shall be as described for stationary mounted sign panels in Section 12-3.06A. The height to the bottom of the sign panel above the edge of traveled way shall be at least one foot.

- If portable signs are displaced or overturned, from any cause, during the progress of the work, the Contractor shall immediately replace the signs in their original locations.

12-3.07 CHANNELIZERS

- Channelizers shall conform to the provisions in the special provisions and these specifications.
- Channelizer posts shall be orange in color.
- Channelizers shall have affixed white retroreflective sheeting as specified in the special provisions. The retroreflective sheeting shall be 3" x 12" in size. The retroreflective sheeting shall be visible at 1,000 feet at night under illumination of legal high beam headlights, by persons with vision of or corrected to 20/20.
- The channelizer bases shall be cemented to the pavement in the same manner as provided for cementing pavement markers to pavement in Section 85-1.06, "Placement." Channelizers shall be applied only on a clean, dry surface.
- Channelizers shall be placed on the alignment and location shown on the plans, or directed by the Engineer. The channelizers shall be placed uniformly, straight on tangent alignment and on a true arc on curved alignment. All layout work necessary to place the channelizers to the proper alignment shall be performed by the Contractor.
- If the channelizers are displaced or fail to remain in an upright position, from any cause, the channelizers shall immediately be replaced or restored to their original location, by the Contractor.

12-3.08 TEMPORARY RAILING (TYPE K)

- Temporary railing (Type K) shall consist of interconnected new or undamaged used precast concrete barrier units as shown on the plans. Exposed surfaces of new and used units shall be freshly coated with a white color paint prior to their first use on the project. The paint shall conform to the provisions in Section 91-4.05, "Paint; Acrylic Emulsion, Exterior White and Light and Medium Tints." Repainting of units, when ordered by the Engineer after the units are in place, will be paid for as extra work in conformance with the provisions in Section 4-1.03D.
- Concrete shall conform to the provisions in Section 90-10, "Minor Concrete." Load tickets and a Certificate of Compliance will not be required.
- Reinforcing steel shall conform to the provisions in Section 52, "Reinforcement."
- Steel bars to receive bolts at ends of concrete panels shall conform to the requirements in ASTM Designation: A 36/A 36M. The bolts shall conform to the requirements in ASTM Designation: A 307.
- A round bar of the same diameter may be substituted for the end-connecting bolt shown on the plans. The bar shall conform to the requirements in ASTM Designation: A 36/A 36M, shall have a minimum length of 26 inches and shall have a 3-inch diameter by $3/8$ inch thick plate welded on the upper end with a $3/16$ inch fillet weld.
- The final surface finish of temporary railings (Type K) shall conform to the provisions in Section 51-1.18A, "Ordinary Surface Finish."

10-1.00 CONSTRUCTION PROJECT INFORMATION SIGNS

Before any major physical construction work readily visible to highway users is started on this contract, the Contractor shall furnish and erect __ Type __ Construction Project Information signs at the locations designated by the Engineer.

The signs and overlays shall be of a type and material consistent with the estimated time of completion of the project and shall conform to the details shown on the plans.

The sign letters, the border and the Department's construction logos shall conform to the colors (non-reflective) and details shown on the plans, and shall be on a white background (non-reflective). The colors blue and orange shall conform to PR Color Number 3 and Number 6, respectively, as specified in the Federal Highway Administration's Color Tolerance Chart.

The sign message to be used for fund types shall consist of the following, in the order shown:

FEDERAL HIGHWAY TRUST FUNDS
STATE HIGHWAY FUNDS
_____ COUNTY TRANSPORTATION FUNDS

The sign message to be used for type of work shall consist of the following:

HIGHWAY CONSTRUCTION
HIGHWAY REPAIR
HIGHWAY IMPROVEMENT
BRIDGE CONSTRUCTION
BRIDGE REPAIR
ROADSIDE WORK

The sign message to be used for the Year of Completion of Project Construction will be furnished by the Engineer. The Contractor shall furnish and install the "Year" sign overlay within 10 working days of notification of the year date to be used.

The letter sizes to be used shall be as shown on the plans. The information shown on the signs shall be limited to that shown on the plans.

The signs shall be kept clean and in good repair by the Contractor.

Upon completion of the work, the signs shall be removed and disposed of outside the highway right of way in conformance with the provisions in Section 7-1.13 of the Standard Specifications.

Full compensation for furnishing, erecting, maintaining, and removing and disposing of the construction project information signs shall be considered as included in the contract lump sum price paid for construction area signs and no additional compensation will be allowed therefor.

10-1.__ CONSTRUCTION AREA SIGNS

Construction area signs for temporary traffic control shall be furnished, installed, maintained, and removed when no longer required in conformance with the provisions in Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications and these special provisions.

Attention is directed to "Furnish Sign" of these special provisions.

Attention is directed to the provisions in "Prequalified and Tested Signing and Delineation Materials" of these special provisions. Type II retroreflective sheeting shall not be used on construction area sign panels. Type III, IV, VII, VIII, or IX retroreflective sheeting shall be used for stationary mounted construction area sign panels.

Attention is directed to "Construction Project Information Signs" of these special provisions regarding the number and type of construction project information signs to be furnished, erected, maintained, and removed and disposed of.

Unless otherwise shown on the plans or specified in these special provisions, the color of construction area warning and guide signs shall have black legend and border on orange background, except W10-1 or W47(CA) (Highway-Rail Grade Crossing Advance Warning) sign shall have black legend and border on yellow background.

Orange background on construction area signs shall be fluorescent orange.

Repair to construction area sign panels will not be allowed, except when approved by the Engineer. At nighttime under vehicular headlight illumination, sign panels that exhibit irregular luminance, shadowing or dark blotches shall be immediately replaced at the Contractor's expense.

The Contractor shall notify the appropriate regional notification center for operators of subsurface installations at least 2 business days, but not more than 14 days, prior to commencing excavation for construction area sign posts. The regional notification centers include, but are not limited to, the following:

Notification Center	Telephone Number
Underground Service Alert	811

Excavations required to install construction area signs shall be performed by hand methods without the use of power equipment, except that power equipment may be used if it is determined there are no utility facilities in the area of the proposed post holes. The post hole diameter, if backfilled with portland cement concrete, shall be at least 4 inches greater than the longer dimension of the post cross section.

Construction area signs placed within 15 feet from the edge of the travel way shall be mounted on stationary mounted sign supports as specified in "Construction Area Traffic Control Devices" of these special provisions.

The Contractor shall maintain accurate information on construction area signs. Signs that are no longer required shall be immediately covered or removed. Signs that convey inaccurate information shall be immediately replaced or the information shall be corrected. Covers shall be replaced when they no longer cover the signs properly. The Contractor shall immediately restore to the original position and location any sign that is displaced or overturned, from any cause, during the progress of work.

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

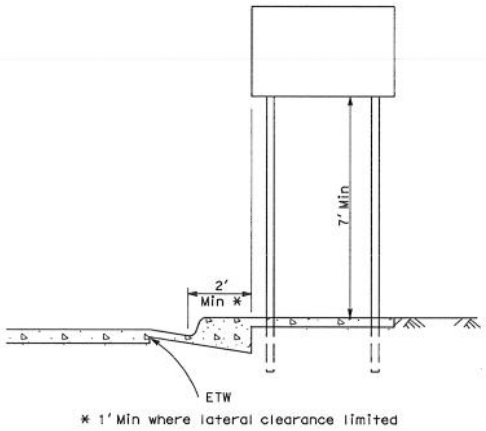
REGISTERED CIVIL ENGINEER

May 1, 2006
PLANS APPROVAL DATE

Greg W. Edwards No. C36386 Exp. 6-30-06 CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

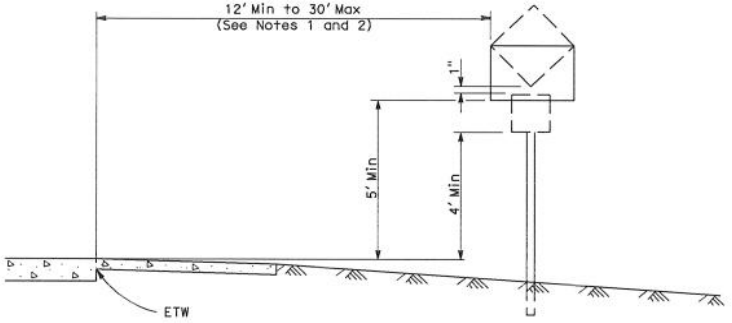
The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

To get to the Caltrans web site, go to: http://www.dot.ca.gov



* 1' Min where lateral clearance limited

URBAN LOCATIONS



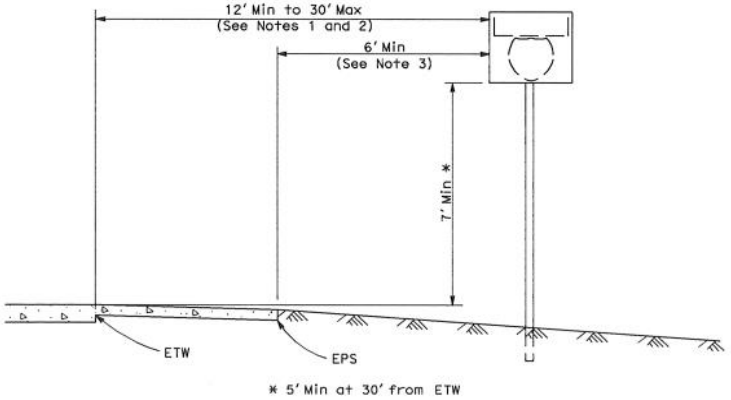
RURAL LOCATIONS

CONVENTIONAL HIGHWAYS AND INTERCHANGE AREAS

NOTES:

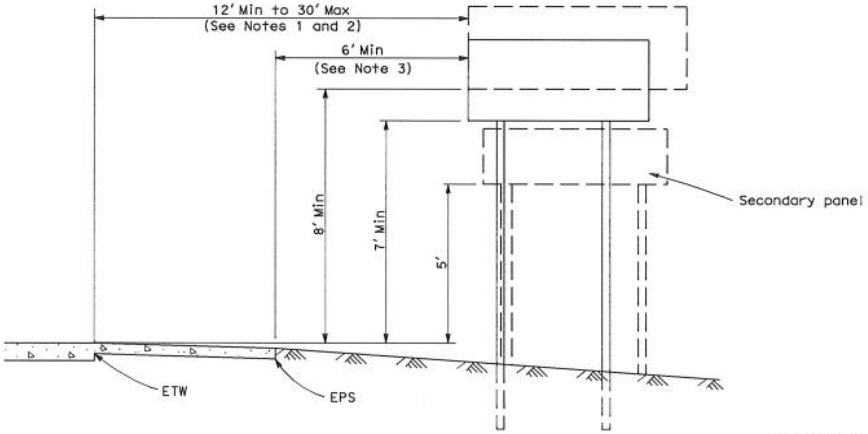
1. When clear roadside recovery areas are provided, signs shall be placed as far from the edge of traveled way as possible, up to a maximum of 30'. When possible, they shall be placed in protected locations.
2. Signs in medians shall be placed at midpoint of median up to a maximum distance of 30' from edge of traveled way. When appropriate, signs for opposing directions shall be placed back to back.
3. Does not apply at locations where minimum horizontal distance is not reasonable due to terrain characteristics, steep slopes, roadway features, or when signs are installed on structures or signal or lighting standards.

EPS = Edge of Paved Shoulder



* 5' Min at 30' from ETW

REGULATORY AND WARNING SIGNS AND ROUTE SHIELDS



GUIDE SIGNS

FREEWAY AND EXPRESSWAY LOCATIONS

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

ROADSIDE SIGNS TYPICAL INSTALLATION DETAILS No. 1

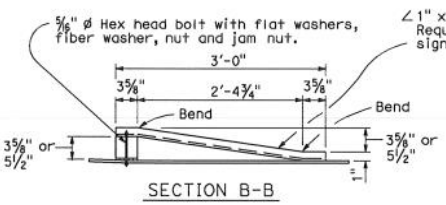
NO SCALE

RS1

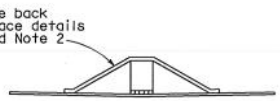
9--27-05

306

2006 STANDARD PLAN RS1

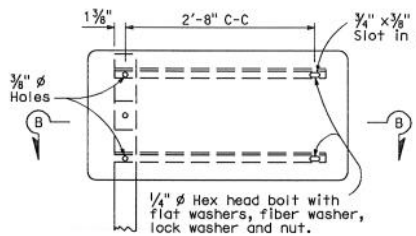


SECTION B-B

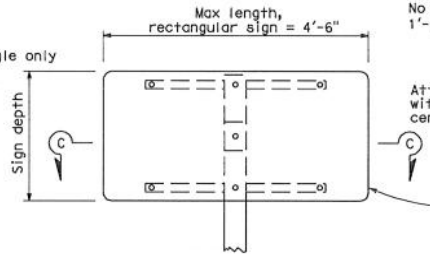


SECTION C-C

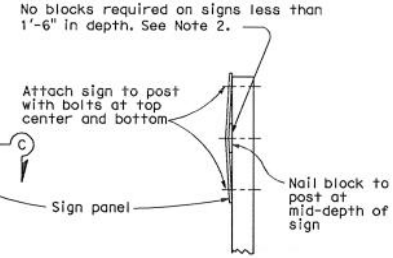
SECTION D-D



UNBALANCED



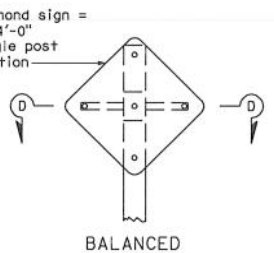
BALANCED



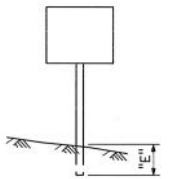
END VIEW

SINGLE POST INSTALLATION

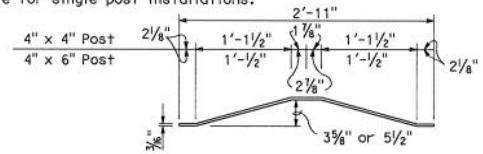
See Note 5 regarding breakaway feature for single post installations.



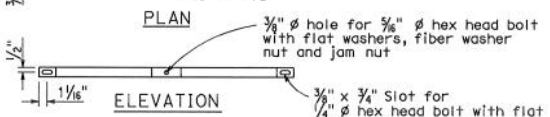
BALANCED



"E" Post Embedment



PLAN



ELEVATION

BACK BRACE DETAILS

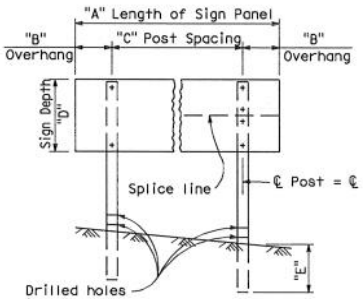
See Note 2

POST EMBEDMENT	
POST SIZE	"E"
4"x4"	3.5'
4"x6"	4.5'
6"x6"	5.0'
6"x8"	6.0'

POST SPACING TABLE		
SIGN PANEL LENGTH "A"	SIGN PANEL OVERHANG "B"	POST SPACING "C"
4'-8" - 5'-6"	7" - 1'-0"	3'-6"
6'-0" & 6'-6"	1'-0" & 1'-3"	4'-0"
7'-0" & 7'-6"	1'-3" & 1'-6"	4'-6"
8'-0"	1'-6"	5'-0"
8'-6"	1'-8"	5'-2"
9'-0"	1'-10"	5'-4"
9'-6"	1'-11"	5'-8"
10'-0"	2'-0"	6'-0"
10'-6"	2'-0"	6'-6"
11'-0",11'-6",12'-0"	2'-0", 2'-3", 2'-6"	7'-0"
12'-6"	2'-6"	7'-6"
13'-0"	2'-6"	8'-0"
13'-6", 14'-6"	2'-6", 3'-0	8'-6"
14'-0", 14'-6"	2'-9", 3'-0"	9'-0"
15'-6", 16'-0"	3'-0", 3'-3"	9'-6"
16'-6"	3'-3"	10'-0"
17'-0", 17'-6"	3'-3", 3'-6"	10'-6"
18'-0", 18'-6"	3'-6", 3'-9"	11'-0"
19'-0"	3'-9"	11'-6"
19'-6", 20'-0"	3'-9", 4'-0"	12'-0"
20'-6", 21'-0"	4'-0", 4'-3"	12'-6"
21'-6"	4'-3"	13'-6"
22'-0", 22'-6"	4'-3", 4'-6"	14'-0"
23'-0"	4'-6"	14'-6"
23'-6", 24'-0"	4'-6", 4'-9"	15'-0"

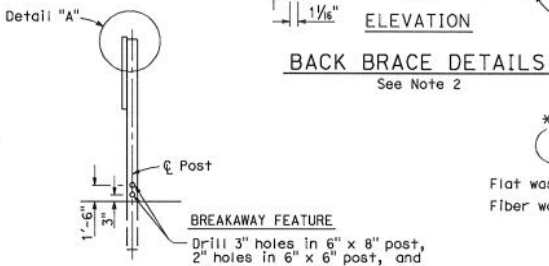
NOTES:

1. Place long dimension of post cross section normal to sign axis. See Section C-C.
2. Balanced single post installations of unframed single sheet aluminum panel signs shall have block spacers if 1'-6" or more in depth and a combination of block spacers and back braces if 1'-6" or more in depth and 2'-10" or more in width. Sign panels less than 1'-6" in depth and 2'-10" or more in width shall have back braces only.
3. For post size see sign layout, format or quantity sheets.
4. Balanced single post installations of Laminated Panel and Framed single sheet panel signs require back braces when 2'-10" or more in length.
5. Breakaway feature for single post installation shall be the same as the breakaway feature shown for the two post installation.
6. Tolerance for diameter of drilled holes in breakaway feature is ±1/8".



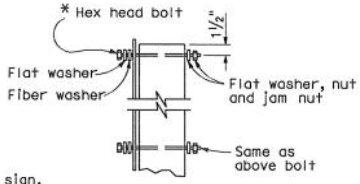
ELEVATION

NOTE:
Bolt hole Layout is dependent on type of panel. Drill holes in post to match panel.



SIDE VIEW

TWO POST INSTALLATION



DETAIL A

* 5/16" ø for single sheet aluminum panel signs.
3/8" ø for laminated panel signs or framed single sheet aluminum panel signs

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER

May 1, 2006
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — Jeffrey B. Woody — No. C41260 — Exp. 3-31-07 — CIVIL — STATE OF CALIFORNIA

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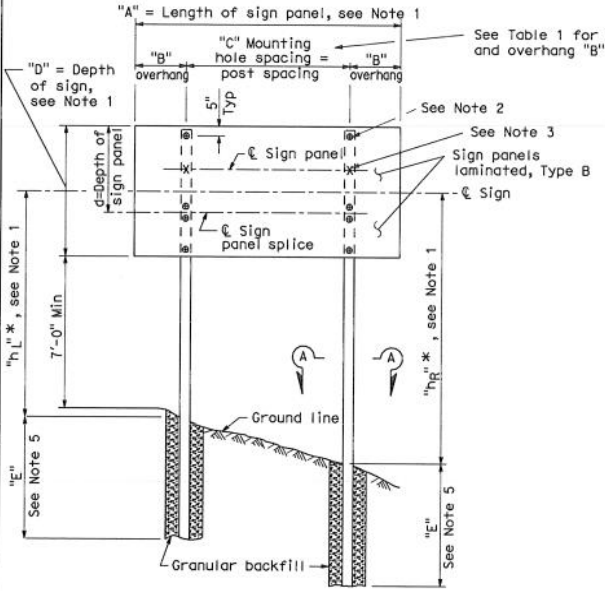
STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

ROADSIDE SIGNS-WOOD POST TYPICAL INSTALLATION DETAILS No. 2

NO SCALE

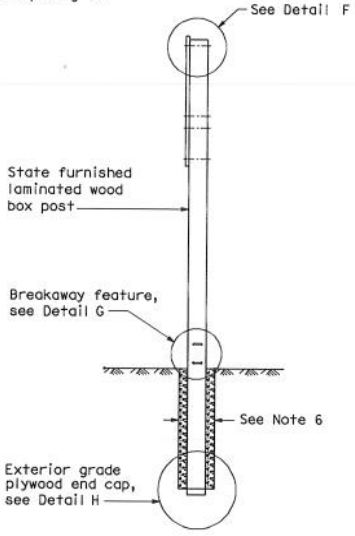
RS2

1-4-06



ELEVATION

* Dimensions shown on project plans are for fabrication. At time of installation adjust these dimensions to provide a level sign approximately 7'-0" above roadway shoulder.



SIDE VIEW

SIGN PANEL LENGTH (See Note 1)	SIGN PANEL OVERHANG	MOUNTING HOLE SPACING
"A"	"B"	"C"
8'-0""	1'-6"	5'-0"
9'-0"	1'-10"	5'-4
10'-0"	2'-0"	6'-0
11'-0"	2'-0"	7'-0"
12'-0"	2'-6"	7'-0"
13'-0"	2'-6"	8'-0"
14'-0"	2'-6"	9'-0"
15'-0"	3'-0"	9'-0"
16'-0"	3'-3"	9'-6"
17'-0"	3'-3"	10'-6"
18'-0"	3'-6"	11'-0"
19'-0"	3'-9"	11'-6"
20'-0"	4'-0"	12'-0"
21'-0"	4'-3"	12'-6"
22'-0"	4'-3"	13'-6"
23'-0"	4'-6"	14'-0"
24'-0"	4'-9"	14'-6"

TABLE 1

"hL" or "hR" (in feet)	TOTAL SIGN AREA SQFT				
	40 to 90	90+ to 140	140+ to 190	190+ to 240	240+ to 290
9'-0" to 13'-0"	6'	6.5'	7.5'	8.5'	9'
13'-0"+ to 17'-0"	6'	7'	8'	9'	10'
17'-0"+ to 21'-0"	6'	7.5'	9'	9'	
21'-0"+ to 26'-0"	7'	8'	9'		

TABLE 2

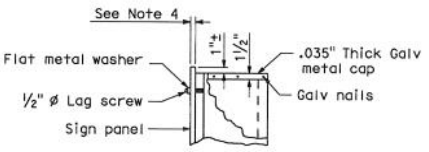
Minimum post embedment "E" for Type L post

NOTES:

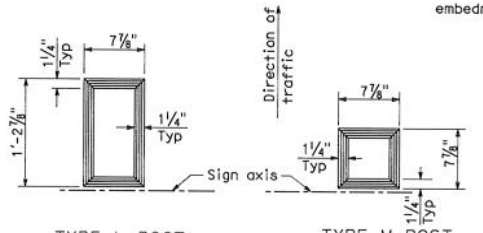
1. See Project Plans for:
   Location of each sign.
   Length of sign panel "A".
   Depth of sign "D".
   Height "h_L" and "h_R" of centerline of sign above ground line at each post.
   Type of post, L and M.
   See Standard Plans RS1 for other details.
2. "●" Indicates location of ½" lag screws and existing holes in panels. Lag screws are to be embedded at least 1" into post using 5/16" diameter pilot holes.
3. "x" Indicates location of additional ½" lag screws required when the depth of sign panel (d) and the length of sign panel (A) are as follows:

A	d
17'-0" to 24'-0"	5'-0"
19'-0" to 24'-0"	4'-6"
21'-0" to 24'-0"	4'-0"
24'-0"	3'-6"

4. Type B laminated sign panels are 1⅛" thick for sign lengths of 15'-0" and less. Panel over 15'-0" in length are 2⅝" thick.
5. Embedment "E" for Type L post shall conform to the requirements in Table 2. Embedment for Type M posts shall be 6'-0" minimum.
6. Diameter of post holes for Type L posts shall be at least 2'-6". Diameter of post holes for Type M posts shall be at least 2'-0".



DETAIL F



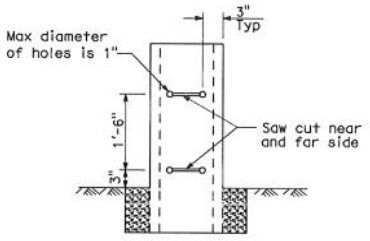
TYPE L POST

TYPE M POST

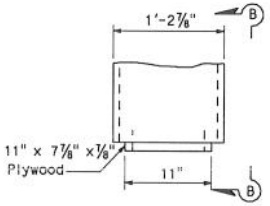
SECTION A-A

GALV METAL CAP

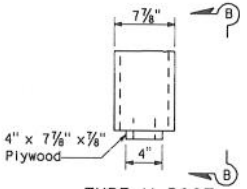
State furnished



DETAIL G

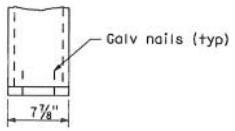


TYPE L POST



TYPE M POST

DETAIL H



SECTION B-B

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

Jeffrey B. Woody
REGISTERED CIVIL ENGINEER

May 1, 2006
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Jeffrey B. Woody No. C41260 Exp. 3-31-07 CIVIL STATE OF CALIFORNIA

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STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

ROADSIDE SIGNS
LAMINATED WOOD BOX POST
TYPICAL INSTALLATION
DETAILS No. 3

NO SCALE

RS3

1-4-06

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER

May 1, 2006
PLANS APPROVAL DATE

Jeffrey B. Woody No. C41260 Exp. 3-31-07 CIVIL — REGISTERED PROFESSIONAL ENGINEER — STATE OF CALIFORNIA

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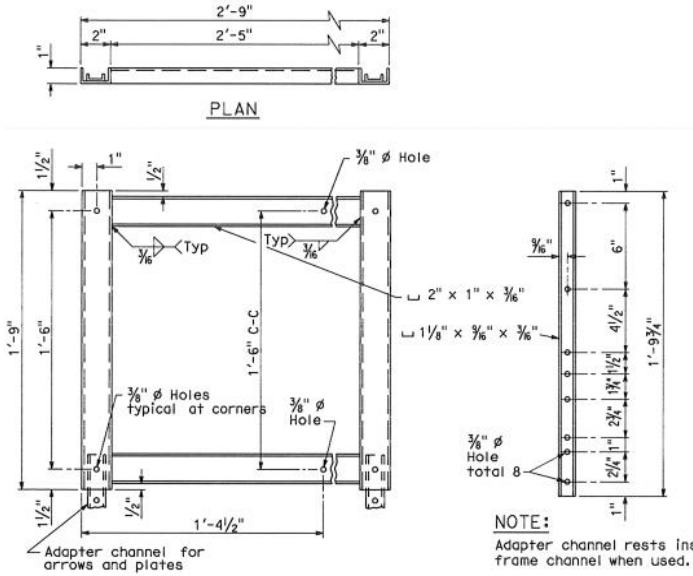
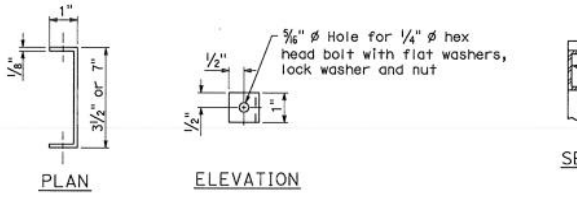
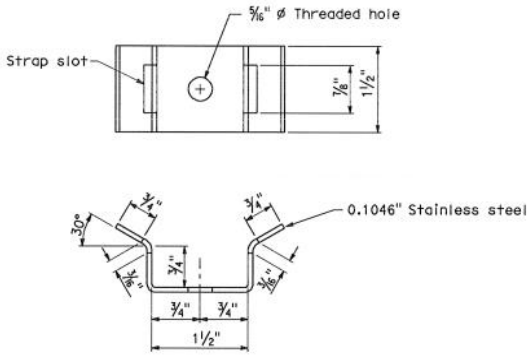
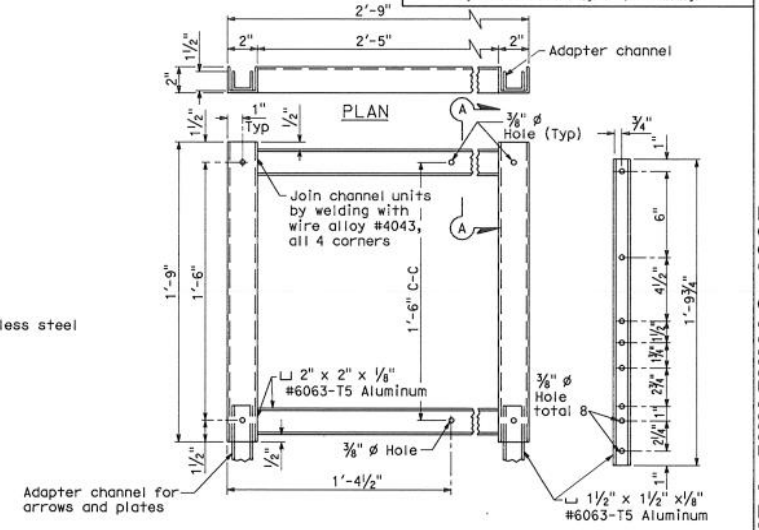


GALVANIZED STEEL FRAME

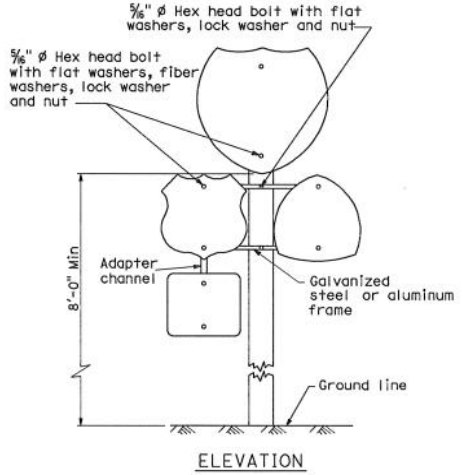




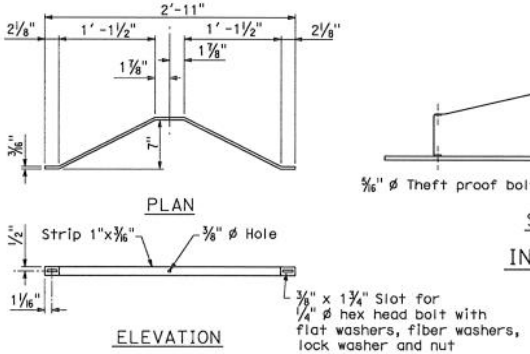
SADDLE BRACKET



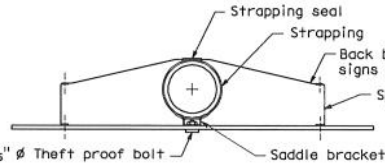
ALUMINUM FRAME



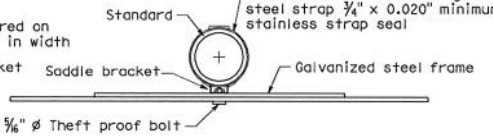
MULTIPLE SIGN INSTALLATION



BACK BRACE DETAILS



SINGLE SIGN



MULTIPLE SIGN

INSTALLATION ON ELECTROLIER, SIGNAL STANDARD OR SIGN STRUCTURE POST

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

ROADSIDE SIGNS TYPICAL INSTALLATION DETAILS No. 4

NO SCALE

RS4

1-4-06

• The contract price paid per pound for install sign structure of the type or types designated in the Engineer's Estimate shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in installing sign structures, complete in place, including installing anchor bolt assemblies, removable sign panel frames, and State-furnished sign panels and performing any welding, painting or galvanizing required during installation, as shown on the plans, as specified in these specifications and the special provisions, and as directed by the Engineer.

• Electrical installations will be paid for as provided in Section 86, "Signals, Lighting and Electrical Systems."

• Spread footing foundation work will be paid for as separate items as provided in their respective sections of these specifications.

• Cast-in-drilled-hole concrete pile foundations will be paid for at the contract price per linear foot for cast-in-drilled-hole concrete pile (sign foundation), for each size included in the Engineer's Estimate, which prices shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in constructing the cast-in-drilled-hole concrete pile and pedestal, complete in place, including reinforcement and any necessary excavation and disposing of excess excavated material, as shown on the plans, as specified in these specifications and the special provisions, and as directed by the Engineer.

56-2 ROADSIDE SIGNS

56-2.01 DESCRIPTION

• This work shall consist of furnishing and installing roadside signs in conformance with these specifications and the special provisions, and in conformance with the details shown on the plans or directed by the Engineer.

56-2.02 MATERIALS

• The various materials and fabrication thereof shall conform to the following requirements:

56-2.02A Metal Posts

• Mountings for roadside signs to be installed on barriers or railings shall be fabricated from welded or seamless steel pipe conforming to the requirements in ASTM Designation: A 53, Grade B and structural steel conforming to the requirements in ASTM Designation: A 36/A 36M. Bolted connections and anchorages shall conform to the provisions in Section 56-1.02C, "Bolts, Nuts and Washers," and the provisions for concrete anchorage devices in Section 75-1.03, "Miscellaneous Bridge Metal."

• Mountings for ground-mounted roadside signs shall be wide flange metal posts fabricated from structural steel conforming to the requirements in ASTM Designation: A 36/A 36M. Bolts, nuts and washers for the breakaway connections of wide flange steel posts shall conform to the requirements in ASTM Designation: A 325 or A 325M.

- All metal parts of roadside sign mountings shall be galvanized after fabrication. Galvanizing shall conform to the provisions in Section 75-1.05, "Galvanizing."

56-2.02B Wood Posts

- Wood posts shall be of the following grades and species. The grades and species allowed for wood posts, 4" x 4" nominal size, are select heart redwood; No. 1 heart structural redwood (1050f); No. 2 heart structural redwood (900f); No. 1 structural light framing Douglas fir, free of heart center; No. 1 structural light framing Hem-Fir, free of heart center; and No. 1 structural light framing Southern yellow pine, free of heart center. The grades and species allowed for wood posts, 4" x 6" nominal size, are select heart grade redwood; select heart structural grade redwood (1100f); No. 1 heart structural redwood (950f); No. 2 structural joists and planks, Douglas fir, free of heart center; No. 1 structural joists and planks Hem-Fir, free of heart center; and No. 2 structural joists and planks Southern yellow pine. The grades and species allowed for wood posts larger than 4" x 6" nominal size are select heart redwood; No. 1 heart structural redwood (950f); No. 1 posts and timbers (also known as No. 1 structural) Douglas fir, free of heart center; select structural posts and timbers Hem-Fir, free of heart center; and No. 1 timbers Southern yellow pine, free of heart center. The sizes shown are minimum, dressed dry sizes.
- Posts shall be graded in conformance with the provisions in Section 57-2, "Structural Timber." Sweep shall not exceed 0.08-foot in 10 feet.
- Before preservative treatment, the moisture content of Douglas fir, Hem-Fir, and Southern yellow pine posts shall be not more than 25 percent as measured at the midpoint of the post in the outer inch, using an approved type of moisture meter, in conformance with the requirements of ASTM Designation: D 4444.
- At the time of delivery to the jobsite, treated posts shall have a moisture content of not more than 25 percent when tested as described above. The posts shall conform in all respects to the specified grading requirements at the time of delivery to the job site.
- Douglas fir and Hem-Fir posts shall be treated in conformance with the provisions in Section 58, "Preservative Treatment of Lumber, Timber and Piling," and in conformance with AWPA Use Category System: UC4A, Commodity Specification A. Posts shall be incised and the minimum retention of preservative shall be as specified in AWPA Standards.
- The cutting of the ends of wood posts in the field will be permitted. Where field cutting or boring of wood posts is performed after treatment, all cuts and holes shall be thoroughly swabbed, sprayed or brushed with 2 applications of the same type of preservative as initially used or copper naphthenate. Application of preservative in the field shall conform to the provisions in the last paragraph in Section 58-1.04, "Wood Preservative for Manual Treatment."
- Wood block spacers, inserted between the post and the sign panel on single post installations as shown on the plans, shall be treated with preservative in the same manner as specified for wood posts.
- Unless specified in the special provisions or shown on the plans, wood posts and blocks shall not be painted.

56-2.02C Laminated Wood Box Posts

- Laminated wood box posts with attached metal caps at the top of each post will be furnished by the State as provided under "Materials" of the special provisions.
- If the laminated wood box posts are not immediately used, the posts shall be neatly stacked on dunnage. The posts shall be handled in a manner that will avoid injury or damage to the posts.

56-2.02D Sign Panel Fastening Hardware

- Frame assemblies for multiple sign installations shall be fabricated of structural steel conforming to the requirements in ASTM Designation: A 36/A 36M, or of aluminum alloy as shown on the plans. Frames fabricated of structural steel shall be hot-dip galvanized after fabrication.
- Back braces for signs shall be commercial quality, mild steel, hot-dip galvanized after fabrication.
- Straps and saddle brackets for mounting sign panels on electroliers, sign structure posts and traffic signal standards or where shown on the plans shall be stainless steel conforming to the requirements in ASTM Designation: A 167, Type 302 or 304. Theft-proof bolts shown on the plans shall be stainless steel with a chromium content of at least 16 percent and a nickel content of at least 8 percent.
- Lag screws, bolts (except theft-proof bolts), metal washers and nuts shall be commercial quality steel, hot-dip galvanized after fabrication. Fiber washers shall be of commercial quality.
- Galvanizing shall conform to the provisions in Section 75-1.05, "Galvanizing."

56-2.03 CONSTRUCTION

- Posts shall be placed in holes excavated in the ground.
- Holes shall be excavated to the required depth for the bottom of the posts as shown on the plans.
- The space around the wood posts shall be backfilled to finished ground surface with selected earth or sand, free of rocks or other deleterious material. The space around laminated wood box posts shall be backfilled to finished ground surface with a granular material. The backfill material shall be placed in layers approximately 0.33-foot thick, and each layer shall be moistened and thoroughly compacted.
- Backfill material for metal posts shall consist of minor concrete conforming to the provisions in Section 90-10, "Minor Concrete," or, at the option of the Contractor, backfill material may consist of portland cement concrete produced from commercial quality aggregates and cement, containing not less than 463 pounds of cement per cubic yard.
- Surplus excavated material shall be disposed of in a uniform manner along the adjacent roadway as directed by the Engineer.
- The line between the center of the top of a post and the center of a post at the ground line shall be plumb within a tolerance of not to exceed 0.02-foot in 10 feet.
- The breakaway saw cuts and holes for the saw cuts in the laminated wood box posts shall be made after installation of the posts. Posts shall not be spliced, and one trim cut at the bottom of the post will be allowed.

- Bolted connections shall conform to the provisions in Section 56-1.03, "Fabrication."
- Holes for bolts, threaded rods or expansion anchorage devices drilled in existing concrete shall be drilled by a method that will not shatter the concrete adjacent to the holes.
- Any spalling or chipping of concrete structures shall be repaired by the Contractor at the Contractor's expense.
- Standard commercial polyvinyl chloride tape, polyethylene tape or other approved corrosion-resistant barrier shall be applied to the areas on metal sign surfaces or hardware that will be in contact with treated wood. Before the bolts are inserted, all bolt holes shall be filled with a grease, recommended by the manufacturer for corrosion protection, which will not melt or run at a temperature of 150° F. The tape, or other corrosion-resistant barrier, and grease shall be furnished by the Contractor. Corrosion-resistant barrier and grease will not be required when wood posts and blocks are treated with pentachlorophenol in hydrocarbon solvent.

56-2.04 SIGN PANEL INSTALLATION

- Sign panels shall be installed by the Contractor in conformance with the details shown on the plans or as directed by the Engineer. Any chipping or bending of sign panels shall be considered as sufficient cause to require replacement of panels at the Contractor's expense.
- Closure inserts shall be installed into the openings at the edges of adjacent sign panel sections. Adjacent edges of sign panels shall be in contact their full length. At sign panel joints, the Contractor shall mount any overlapping letters and borders on the face of the sign with blind, self-plugging type rivets.
- Sign panels shall be attached to metal and wood posts, laminated wood box posts, electroliers, sign structure posts and traffic signal standards and mast arms with fastening hardware of the types and sizes shown on the plans.
- Lag screws shall be installed by turning the lag screw into pilot holes by use of a wrench. The pilot holes shall be bored with a bit diameter equal to the root diameter of the lag screw thread.
- Sign panels, blind rivets and closure inserts will be furnished by the State as provided under "Materials" of the special provisions.
- All fastening hardware shall be furnished by the Contractor.

56-2.05 MEASUREMENT

- Roadside signs on wood posts will be measured by the unit from actual count. One or more sign panels mounted on a single post installation will be counted as a roadside sign-one post, and one or more sign panels mounted on a two post installation will be counted as a roadside sign-two post.
- The installing of roadside signs on laminated wood box posts will be measured as units determined from actual count. A unit shall consist of installing 2 posts with sign panels, fastening hardware and metal caps complete in place.
- Roadside signs mounted on barriers or railings will be measured by the pound as metal (rail mounted sign) for the quantity of steel (including pipe posts, base plates, anchorage assemblies and other metal parts, except sign panels and sign

panel fastening hardware). The pay quantities will be determined as provided in Section 55-4.01, "Measurement."

- The wide flange metal posts and parts shown on the plans for supporting roadside signs will be measured by the pound for the steel posts. The pay quantities will be determined as provided in Section 55-4.01, "Measurement."
- The installing of roadside signs by the strap and saddle bracket method on electroliers, sign structure posts and traffic signal standards, and by the mast arm hanger method on traffic signal mast arms will be measured as units determined from actual count of the sign panels in place.

56-2.06 PAYMENT

- Items of work, measured as specified in Section 56-2.05, "Measurement," will be paid for at the contract prices per pound for metal (roadside sign), per pound for metal (rail mounted sign), per unit for roadside sign-one post and roadside sign-two post, per unit for install roadside sign (laminated wood box post), per unit for install sign (strap and saddle bracket method), and per unit for install sign (mast arm hanger method).
- The above prices and payments shall include full compensation for furnishing all labor, materials (except State-furnished materials), tools, equipment, and incidentals, and for doing all the work involved in furnishing and installing roadside signs, complete in place, including the installation of sign panels, as shown on the plans, and as specified in these specifications and the special provisions, and as directed by the Engineer.
- Frame assemblies for multiple sign installations, back braces, straps and saddle brackets, lag screws, bolts, washers and nuts as specified in Section 56-2.02D, "Sign Panel Fastening Hardware," shall be considered as sign panel fastening hardware. Full compensation for furnishing and installing sign panel fastening hardware shall be considered as included in the contract prices paid for the roadside signs requiring the hardware and no separate payment will be made therefor.

10-1.__ FURNISH SIGN

Signs shall be fabricated and furnished in accordance with details shown on the plans, the Traffic Sign Specifications, and these special provisions.

Traffic Sign Specifications for California sign codes are available for review at:

http://www.dot.ca.gov/hq/traffops/signtech/signdel/specs.htm

Traffic Sign Specifications for signs referenced with Federal MUTCD sign codes can be found in Standard Highway Signs Book, administered by the Federal Highway Administration, which is available for review at:

http://mutcd.fhwa.dot.gov/ser-shs_millennium.htm

Information on cross-referencing California sign codes with the Federal MUTCD sign codes is available at:

http://www.dot.ca.gov/hq/traffops/signtech/signdel/specs.htm

Temporary or permanent signs shall be free from blemishes that may affect the serviceability and detract from the general sign color and appearance when viewing during daytime and nighttime from a distance of 25 feet. The face of each finished sign shall be uniform, flat, smooth, and free of defects, scratches, wrinkles, gel, hard spots, streaks, extrusion marks, and air bubbles. The front, back, and edges of the sign panels shall be free of router chatter marks, burns, sharp edges, loose rivets, delaminated skins, excessive adhesive over spray and aluminum marks.

QUALITY CONTROL FOR SIGNS

The requirements of "Quality Control for Signs" in this section shall not apply to construction area signs.

No later than 14 days before sign fabrication, the Contractor shall submit a written copy of the quality control plan for signs to the Engineer for review. The Engineer will have 10 days to review the quality control plan. Sign fabrication shall not begin until the Engineer approves the Contractor's quality control plan in writing. The Contractor shall submit to the Engineer at least 3 copies of the approved quality control plan. The quality control plan shall include, but not be limited to the following requirements:

A. Identification of the party responsible for quality control of signs,
B. Basis of acceptance for incoming raw materials at the fabrication facility,
C. Type, method and frequency of quality control testing at the fabrication facility,
D. List (by manufacturer and product name) of process colors, protective overlay film, retroreflective sheeting and black non-reflective film,
E. Recommended cleaning procedure for each product, and
F. Method of packaging, transport and storage for signs.

No legend shall be installed at the project site. Legend shall include letters, numerals, tildes, bars, arrows, route shields, symbols, logos, borders, artwork, and miscellaneous characters. The style, font, size, and spacing of the legend shall conform to the Standard Alphabets published in

the FHWA Standard Highway Signs Book. The legend shall be oriented in the same direction in accordance with the manufacturer's orientation marks found on the retroreflective sheeting.

On multiple panel signs, legend shall be placed across joints without affecting the size, shape, spacing, and appearance of the legend. Background and legend shall be wrapped around interior edges of formed panel signs as shown on plans to prevent delamination.

The following notation shall be placed on the lower right side of the back of each sign where the notation will not be blocked by the sign post or frame:

A. PROPERTY OF STATE OF CALIFORNIA,
B. Name of the sign manufacturer,
C. Month and year of fabrication,
D. Type of retroreflective sheeting, and
E. Manufacturer's identification and lot number of retroreflective sheeting.

The above notation shall be applied directly to the aluminum sign panels in 1/4-inch upper case letters and numerals by die-stamp and applied by similar method to the fiberglass reinforced plastic signs. Painting, screening, or engraving the notation will not be allowed. The notation shall be applied without damaging the finish of the sign.

Signs with a protective overlay film shall be marked with a dot of 3/8 inch in diameter. The dot placed on white border shall be black, while the dot placed on black border shall be white. The dot shall be placed on the lower border of the sign before application of the protective overlay film and shall not be placed over the legend and bolt holes. The application method and exact location of the dot shall be determined by the manufacturer of the signs.

For sign panels that have a minor dimension of 48 inches or less, no splice will be allowed in the retroreflective sheet except for the splice produced during the manufacturing of the retroreflective sheeting. For sign panels that have a minor dimension greater than 48 inches, only one horizontal splice will be allowed in the retroreflective sheeting.

Unless specified by the manufacturer of the retroreflective sheeting, splices in retroreflective sheeting shall overlap by a minimum of one inch. Splices shall not be placed within 2 inches from edges of the panels. Except at the horizontal borders, the splices shall overlap in the direction from top to bottom of the sign to prevent moisture penetration. The retroreflective sheeting at the overlap shall not exhibit a color difference under the incident and reflected light.

Signs exhibiting a significant color difference between daytime and nighttime shall be replaced immediately.

Repairing sign panels will not be allowed except when approved by the Engineer.

The Department will inspect signs at the Contractor's facility and delivery location, and in accordance with Section 6, "Control of Materials," of the Standard Specifications. The Engineer will inspect signs for damage and defects before and after installation.

Regardless of kind, size, type, or whether delivered by the Contractor or by a common carrier, signs shall be protected by thorough wrapping, tarping, or other methods to ensure that signs are not damaged by weather conditions and during transit. Signs shall be dry during transit and shipped on palettes, in crates, or tier racks. Padding and protective materials shall be placed between signs as appropriate. Finished sign panels shall be transported and stored by method that protects the face of signs from damage. The Contractor shall replace wet, damaged, and defective signs.

Signs shall be stored in dry environment at all times. Signs shall not rest directly on the ground or become wet during storage. Signs, whether stored indoor or outdoor, shall be free standing. In areas of high heat and humidity signs shall be stored in enclosed climate-controlled trailers or containers. Signs shall be stored indoor if duration of the storage will exceed 30 days.

Screen processed signs shall be protected, transported and stored as recommended by the manufacturer of the retroreflective sheeting.

When requested, the Contractor shall provide the Engineer test samples of signs and materials used at various stages of production. Sign samples shall be 12" x 12" in size with applied background, letter or numeral, and border strip.

The Contractor shall assume the costs and responsibilities resulting from the use of patented materials, equipment, devices, and processes for the Contractor's work.